



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/569,554

11/02/2006

David Farrusseng

0512-1324

7749

466 7590 05/26/2010

YOUNG & THOMPSON  
209 Madison Street  
Suite 500  
Alexandria, VA 22314

EXAMINER

POLYANSKY, ALEXANDER

ART UNIT

PAPER NUMBER

1793

NOTIFICATION DATE

DELIVERY MODE

05/26/2010

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

DocketingDept@young-thompson.com



## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on March 5, 2010 has been entered.

### ***Status of Previous Rejections***

The 35 U.S.C. 103(a) rejection of claim(s) 24-26, 31-32, 34, and 36-37 as being unpatentable over Chen et al, US 6,187,157 has been withdrawn in view of the applicants' amendment and arguments (filed March 5, 2010) found on page 8 of the Remarks distinguishing the instantly claimed particle weight percent (claim 8 line 14) over the prior art.

The 35 U.S.C. 103(a) rejection of claim(s) 35 as being unpatentable over Chen et al. in view of Hazbun US 4,791,079 has been withdrawn in view of the withdrawal of Chen as stated above.

### ***Examination on the Merits***

Claims 24-26, 31-32, and 34-45 remain for examination. Claim 24 has been amended. Claim 33 has been cancelled. Claims 38-45 have been withdrawn.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Art Unit: 1793

Claim 25 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 25 recites the limitation "and/or" in line 3. There is insufficient antecedent basis for this limitation in the claim.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 24-26, 31-32, and 36-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Haile et al. US 2005/0026006.**

**Regarding claims 24 and 31**, Haile teaches the solid oxygen conducting membrane (abstract, pars. 5, etc.) comprising:

-mixed conducting membranes (claim 18, column 9, lines 25) of multimetal (Table 1) oxide coated with solid electrolyte ion transport powder which is one of Pt, Pd, Ag or Au (par. 34).

With respect to the claimed feature "dense" because the perovskite of Haile is operable at very high temperatures, i.e. 800-1000°C (Haile par. 6), the perovskite of Haile would be expected to be "dense" based on the applicants' disclosure of "dense" membrane found at paragraph 14 in the specification of the published US 2007/0151857.

Art Unit: 1793

Haile teaches the mixed oxygen conducting membrane is  $\text{Ba}_x\text{Sr}_{1-x}\text{Co}_{1-y}\text{Fe}_y\text{O}_{3-z}$ , wherein x is 0.5 and y is 0.2 as required by claim 31 (par. 42, claim 61), which meets the claimed formula and x and y values of claim 24.

Haile teaches the Pt, Pd, Ag or Au are present in the amount from 0 to 60wt% (par. 34), which overlaps the instantly claimed range and is thus prima facie obvious. See MPEP 2144.05(I).

**Regarding claim 26**, Haile teaches a mixed conducting dense multimetal oxide membrane has a perovskite structure (title).

**Regarding claim 32**, Haile teaches the thickness range of the mixed conducting membrane is appx. 0.745 mm (example 1, par. 42), which is within the claimed thickness range.

**Regarding claims 36 and 37**, Haile teaches the noble metals are Pt, Pd, Ag or Au (par. 34).

**Claim 34 is rejected under 35 U.S.C. 103(a) as being unpatentable over Haile et al. US 2005/0026006 as applied to claim 24 above and further in view of Chen et al, US 6,187,157.**

**Regarding claim 34**, Haile does not specify the particles are based on MgO.

Chen teaches a mixed conducting dense membrane similar to Haile, and further discloses that the catalytic activity of the second phase, such as MgO, improves surface reaction kinetics of the composite ion transport membranes and an increased catalytic activity can mitigate an otherwise higher cost of the electronic conducting phase (Chen col. 13, lines 4-9 and 19).

Art Unit: 1793

It would be obvious to one of ordinary skill in the art to modify the dense membrane of Haile with the second phase, i.e. MgO, of Chen in order to improve the surface reaction kinetics of the composite ion transport membranes and to increase catalytic activity.

**Claim 35 is rejected under 35 U.S.C. 103(a) as being unpatentable over Haile et al. US 2005/0026006 in view of Chen et al, US 6,187,157 as applied to claim 34 above and further in view of Hazbun, E., US 4,791,079.**

**Regarding claim 35**, Haile in view of Chen does not specify the particles are based on MgO doped using vanadium.

Hazbun teaches doping MgO with vanadium (column 2, lines 23-36) in a process wherein a two-layer conducting catalytic ceramic membranes are produced.

It would be obvious to a person of ordinary skill in the art to dope the MgO of Haile in view of Chen in view of the disclosure of Hazbun in order to stabilize ion and electron conductivity. It is noted that the reference teaches vanadia doped materials with preferred compositions; however, after all the substations have been made, it would be readily apparent that another embodiment exists with magnesia doped vanadia.

In the alternative, because the claim limits that the particles “are doped using vanadium”, it is a product by process claim, however, the invention is drawn to a product, the membrane, and even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process. See MPEP 2113. In the instant case, the process limitation in

Art Unit: 1793

claim 35 does not impart the structure or properties in the claimed product, i.e. the membrane; therefore, it is not given patentable weight.

***Response to Amendment***

The declaration under 37 CFR 1.132 filed March 5, 2010 is insufficient to overcome the new rejection of claims 24-26, 31-32, 34 and 35-37 based upon 35 U.S.C. 103(a) rejection of claim(s) 24-26, 31-32, 34, and 36-37 as being unpatentable over Chen et al, US 6,187,157 as set forth in the last Office action because:

It refer(s) only to the system described in the above referenced application and not to the individual claims of the application. Thus, there is no showing that the objective evidence of nonobviousness is commensurate in scope with the claims. See MPEP § 716.

Further, the submitted 132 declaration is insufficient in that it is not commensurate with the scope of the recited range of magnesium oxide or noble metals as claimed in the instant claim 24. In order to meet said commensurability, the Applicants would need to provide examples using the following MgO or noble metals samples: a 0.01wt% sample, a 0.1wt% sample, a sample that's between the outer limits (the one from the instant declaration would work, i.e. 0.014wt%) and two more samples on either side of the outer limits, i.e. less than 0.01wt% and greater than 0.1wt%.

Further, the declaration is moot in view of the withdrawal of the reference Chen et al. which was used to reject claims 24-26, 31-32, 34, and 36-37.

In view of the foregoing, when all of the evidence is considered, the totality of the rebuttal evidence of nonobviousness fails to outweigh the evidence of obviousness.

***Response to Arguments***

Applicant's arguments filed March 5, 2010 have been fully considered but they are not persuasive.

Arguments are as follows:

(I). Applicants submit that neither CHEN et al. nor HAZBUN et al. teaches a membrane comprising a multimetal oxide having the formula  $\text{Ba}_{0.5}\text{Sr}_{0.5}\text{Co}_{0.8}\text{Fe}_{0.2}\text{O}_{3-z}$ , covered by 0.01 to 0.1 % wt of dispersed particles of magnesium oxide or noble metals according to the instant claims. More precisely, only examples 1, 2 and 3 of CHEN et al. give detail about the ratio of metal used, i.e. 20% wt (Column 13, line 35 - Column 14, line 39 and Column 15, line 23) . Moreover, only example 2 of HAZBUN et al. disclose the ratio of metal used, i.e. from 0.5 to 15% wt of silver (Column 9, lines 21-23), in particular 8% (Column 9, line 35). That is, the membranes of CHEN et al. and HAZBUN et al. contain much more metal catalyst than the claimed membrane and the applied art does not suggest that a lower ratio of metal could be used.

***In response***, because Chen has been withdrawn and reapplied for a different purpose in the body of the rejections, the arguments are moot in view of the withdrawal of Chen.

Further, Hazbun has been combined with a new reference, Haile, and thus any and all arguments with respect on the combination of Chen and Hazbun are also moot.

(II). Applicants submit that the claimed membrane not only allow using less noble metal or magnesium oxide catalyst, which is economically advantageous in terms of cost, but the claimed membrane also advantageously exhibits better oxygen fluxes than membranes of the prior art. (See Page 9, paragraph 3 of the present application.) As discussed in the previously filed amendment, the unexpected result is clearly presented in the attached article, now



Art Unit: 1793

published. On the other hand, the best oxygen flux reported in CHEN et al. which describes that the oxygen flux at 900°C of the membrane of example 1 is 2 ml/cm<sup>2</sup> min (From figure 4, for a 1 mm thickness) and the one of example 3 (50Pd/50Ag coated Ce<sub>0.8</sub>Gd<sub>0.2</sub>O<sub>2-x</sub>) is 0.06 ml/cm<sup>2</sup> min.

In response to the Advisory Action, a declaration signed by a co-inventor is attached to this paper, along with his resume. The declaration demonstrates that the claimed oxygen conducting membrane exhibits better oxygen fluxes than the membranes of CHEN et al., as discussed above. As a result, the data of unexpected results set forth in the attached declaration fully rebut any unpatentability that can be alleged. As discussed above, neither CHEN et al. nor HAZBUN et al. teach or infer all the elements recited in the instant claims. One of ordinary skill and creativity in the art would thus fail to produce a claimed embodiment of the present invention from a knowledge of CHEN et al. or the combination of CHEN et al. and HAZBUN et al. A prima facie case of unpatentability has thus not been made. Also, the present invention displays unexpected results, as discussed above and set forth in the attached Declaration.

***In response***, the examiner's position with regard to the submitted declaration and the reference Chen as applied to claims in the office action dated July 30, 2009 is as stated above. The declaration does not appear to be commensurate in scope with the claimed ranges of MgO or noble metals as stated above. Chen has been withdrawn.

(III). Applicants request that as allowable subject matter has been indicated, rejoinder and consideration of all the claims on the merits is respectfully requested.

***In response***, as noted in the last interview with Mr. Goozner, the Applicants have the option to provide the office with a certified translation of the foreign document in order to

Art Unit: 1793

antedate the new Haile reference. Once that is accomplished, a rejoinder will be considered given that the claims are allowable.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ALEXANDER POLYANSKY whose telephone number is (571)270-5904. The examiner can normally be reached on Monday-Friday, 8:00 a.m. EST - 5:00 p.m. EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jessica Ward can be reached on 571-272-1223. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Alexander Polyansky/  
Examiner, Art Unit 1793

/Jessica L. Ward/  
Supervisory Patent Examiner, Art Unit 1793

Application/Control Number: 10/569,554

Page 10

Art Unit: 1793